



Dart Aerospace Ltd.  
1270 Aberdeen St  
Hawkesbury, ON  
K6A 1K7  
Canada

Tel (613) 632-5200

**D119-796-141**  
**Job Sheet 171236**



**Part No:** D119-796-141

**Job Qty:** 1 ea

**Part Name:** Fwd Crosstube Installation Without Step (No Hardware)



**Part Weight:** 0 lbs

**Status:** Scheduled

**Priority:** Medium

**Job Created:** 1/30/18

**Job Tracking No:**

**Due Date:** 2/28/18

**Created By:** Michelle Gagnon-Donovan

**Type:** Stock

**Description:**

**Note:** DRWG D119-795-141 IPP REV:C 14.11.19 AS PER REV:C DD VERF:JLM IPP REV:D 14.12.12 AS PER REV:pd1 DD VERF:JLM IPP REV:E 15.02.11 AS PER REV F JLM VERIFIED BY:DD

**Ship Via:**

### Bill of Materials

### Job Routing

| Op No | Operation           | Qty   | Start Date | Due Date | Standard  |         | Workcenter/Supplier   |           | Sign-off |
|-------|---------------------|-------|------------|----------|-----------|---------|-----------------------|-----------|----------|
|       |                     |       |            |          | Setup hrs | Run Hrs | Workcenter / Supplier | Lead Time |          |
| 90    | Start up Operation  | 1 Ea  |            | 2/27/18  | 0.00      | 0.00    | Start Up Crosstubes-1 |           | GP       |
| 120   | Packaging           | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | Packaging1-1          |           |          |
| 130   | CNC Bend Crosstubes | 1 pcs |            | 2/27/18  | 0.00      | 3.85    | CNC Bend Crosstube    |           |          |
| 140   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC15                  |           |          |
| 145   | Crosstubes          | 1 pcs |            | 2/27/18  | 0.00      | 3.06    | Crosstubes-1          |           |          |
| 150   | Crosstubes          | 1 pcs |            | 2/27/18  | 0.00      | 3.06    | Crosstubes-1          |           |          |
| 160   | HandFXtube          | 1 pcs |            | 2/27/18  | 0.00      | 1.49    | HandFinish5           |           |          |
| 175   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC7-1                 |           |          |
| 180   | Outsource           | 1 pcs |            | 2/27/18  |           |         | SKY002-VC             | 2         |          |
| 190   | Packaging           | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | Packaging1-1          |           |          |
| 200   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC5                   |           |          |
| 230   | SprayPaint          | 1 pcs |            | 2/27/18  | 0.00      | 1.36    | Spray Paint           |           |          |
| 240   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC14                  |           |          |
| 242   | Crosstubes          | 1 pcs |            | 2/27/18  | 0.00      | 3.06    | Crosstubes-1          |           |          |
| 244   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC5                   |           |          |
| 246   | SprayPaint          | 1 pcs |            | 2/27/18  | 0.00      | 1.36    | Spray Paint           |           |          |
| 248   | SprayPaint          | 1 pcs |            | 2/27/18  | 0.00      | 1.36    | Spray Paint           |           |          |
| 250   | QC                  | 1 pcs |            | 2/27/18  | 0.00      | 0.00    | QC14                  |           |          |
| 252   | Crosstubes          | 1 pcs |            | 2/28/18  | 0.00      | 3.06    | Crosstubes-1          |           |          |
| 260   | QC                  | 1 pcs |            | 2/28/18  | 0.00      | 0.00    | QC5                   |           |          |
| 275   | DC                  | 1 pcs |            | 2/28/18  | 0.00      | 0.00    | DC                    |           |          |
| 290   | Packaging           | 1 pcs |            | 2/28/18  | 0.00      | 0.00    | Packaging3-1          |           |          |
| 300   | QC21-FG             | 1 Ea  |            | 2/28/18  | 0.00      | 0.00    | QC21                  |           |          |

Part Op 130 - Bend tube as per Dwg D119-796-141 using CNC bender program  
Descriptions: 145 - 1- CUT TUBE AT HEIGHT ON FAI SHEET 2- VERIFY HEIGHT: \_\_\_\_\_ BY QC15 LEVEL  
INSPECTOR: \_\_\_\_\_ 3- DEBURR CUT SURFACE  
150 - \*\*\*\*\* ENSURE PROPER JIG POSITIONING \*\*\*\*\* ENSURE PROPER JIG POSITIONING  
\*\*\*\*\* 1-DRILL TUBE AS PER DWG USING DT \_\_\_\_\_ 2- DRILL RIVET HOLES USING DT8787 FWD 3-  
DEBURR AND C/SINK RIVET HOLES AS PER DWG 4- FLIP TUBE, REPEAT STEP 2 AND 3 5- SCRIBE PART# AND  
BATCH# USING VIBRATING STYLUS ON INSIDE OF CUFF AS PER DWG D119-796-141 6- INSPECT AND REMOVE  
ALL MARKS FROM TUBE WITHIN LIMITS ON DWG D119-796-141  
160 - \*\*\*IMMEDIATELY AFTER GRINDING\*\*\* 1- handfinish X-TUBE INSIDE AND OUT 2- ALODINE AND ACID ETCH X-  
TUBE INSIDE AND OUT AS PER QSI005.  
180 - \*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\* Liquid Penetrant Inspection as per QSI 038Or  
Issue P/O: \_\_\_\_\_ LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order  
190 - Ensure copy of NDT results attached to work order.  
200 - \*\*\* WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE\*\*\* Inspect for damage & ensure results are as per

Plex 2/8/18 8:00 AM Dart. Gagnon.Michelle



Dwg D119-796-141

230 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_ \*\*\*VERIFY BY \_\_\_\_\_ PART #

TO MATCH W/O \_\_\_\_\_ \*\*\*MASK SCRIBE B# &amp; P# AND VERIFY\*\*\* 1- Prime Inside of tube. 2- Install

nut plates as per dwg (D2873-043) 3- Mask cuffs per note#2. 4- Prime exterior of tube per QSI005. Primer

Batch: \_\_\_\_\_ Start Time: \_\_\_\_\_ Finish Time: \_\_\_\_\_

240 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_

242 - Assemble as per dwg D119-796-141 and Qsi 015 1- Abrade mating surfaces with Scotch Brite 7447 and clean with Dupont 4105s or equivalent as per dwg. 2- Install D5152-041 with proseal 890 on concave surface, 0.100" MIN thick as per dwg using DT10089 (identified right and left) \*\*\*\*MAINTAIN CLAMPING PRESSURE ON FOR MIN 72HRS\*\*\*\*

Proseal Batch: \_\_\_\_\_ EXP: \_\_\_\_\_ PROSEAL CURE TIME 72 HOURS:

Start: \_\_\_\_\_ Finish: \_\_\_\_\_ 3- Install support and shim using proseal 890 per dwg and clamp in position.

244 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_

246 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_ 1- Remove all non-fixed hardware and clean any excess proseal. 2- Scuff tube with Scotch Brite 7447. 3- Mask cuff per note#2. 4- Prime as per dwg and QSI005 5- Apply matte clear as per dwg and QSI005 Clear Batch: \_\_\_\_\_

248 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_ 1- Mask underside of tube as per dwg. Mask cuff per note#2. 2- Scuff tube with Scotch Brite 7447 3- Paint outside of crosstube Paint

Batch: \_\_\_\_\_

250 - \*\*\*VERIFY BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_

252 - 1- Re-install non fixed hardware per dwg \*\*\*Torque all clamps to 80-100 IN-LBS.\*\*\* 2- Apply a filet-seal of proseal 890 around supports. Allow proseal to dry before inspecting. Proseal 890 Batch: \_\_\_\_\_

EXP: \_\_\_\_\_ PROSEAL CURE TIME 72 HOURS: Start: \_\_\_\_\_

Finish: \_\_\_\_\_

260 - \*\*\*RE-CHECK TORCQUE ON CLAMP AFTER PROSEAL HAS CURED AS PER DWG.\*\*\* \*\*\*VERIFY

BY \_\_\_\_\_ BATCH # TO MATCH W/O \_\_\_\_\_

275 - Photocopy bluefile and create labels as per PPP D119-796-141 chg 004

290 - Identify and pack for shipping as per PPP D119-796-141

## Job BOM

| Part / Item     | Component Name           | Quantity      | Operation             | Container |
|-----------------|--------------------------|---------------|-----------------------|-----------|
| D119-796-141TRN | Crosstube Turning Detail | 1 Ea (1 ea)   | 90-Start up Operation | 5020526   |
| CR3212-4-08     | Rivet                    | 16 Ea (16 ea) | 242-Crosstubes        |           |
| D2873-043       | Nut Plate Assembly       | 4 Ea (4 ea)   | 242-Crosstubes        |           |
| D5123-3         | Clamp Cushion            | 4 Ea (4 ea)   | 242-Crosstubes        |           |
| D5124-1         | Fwd Support              | 2 Ea (2 ea)   | 242-Crosstubes        |           |
| D5152-041       | Fwd Post Mount Assembly  | 2 Ea (2 ea)   | 242-Crosstubes        |           |
| D5305-1         | Shim                     | 2 Ea (2 ea)   | 242-Crosstubes        |           |
| MS21920-24      | Clamp                    | 4 Ea (4 ea)   | 252-Crosstubes        |           |

## Job Allocations

| Operation                     | Component Part  | Required | Inventory | Allocated |
|-------------------------------|-----------------|----------|-----------|-----------|
| 90-Start up Operation 5020526 | D119-796-141TRN | 1        | 7         | 0         |
| 242-Crosstubes                | CR3212-4-08     | 16       | 159       | 0         |
|                               | D2873-043       | 4        | 35        | 0         |
|                               | D5123-3         | 4        | 338       | 0         |
|                               | D5124-1         | 2        | 6         | 0         |
|                               | D5152-041       | 2        | 4         | 0         |
|                               | D5305-1         | 2        | 6         | 0         |
| 252-Crosstubes                | MS21920-24      | 4        | 77        | 0         |



Container No: S048071



Part: D119-796-141

Job No: 171236

Serial No/Batch: S048071

Revision:

Inspector:

Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
CANADA  
TEL.: 1 613 632-5200  
Email: sales@dartaero.com  
www.dartaerospace.com

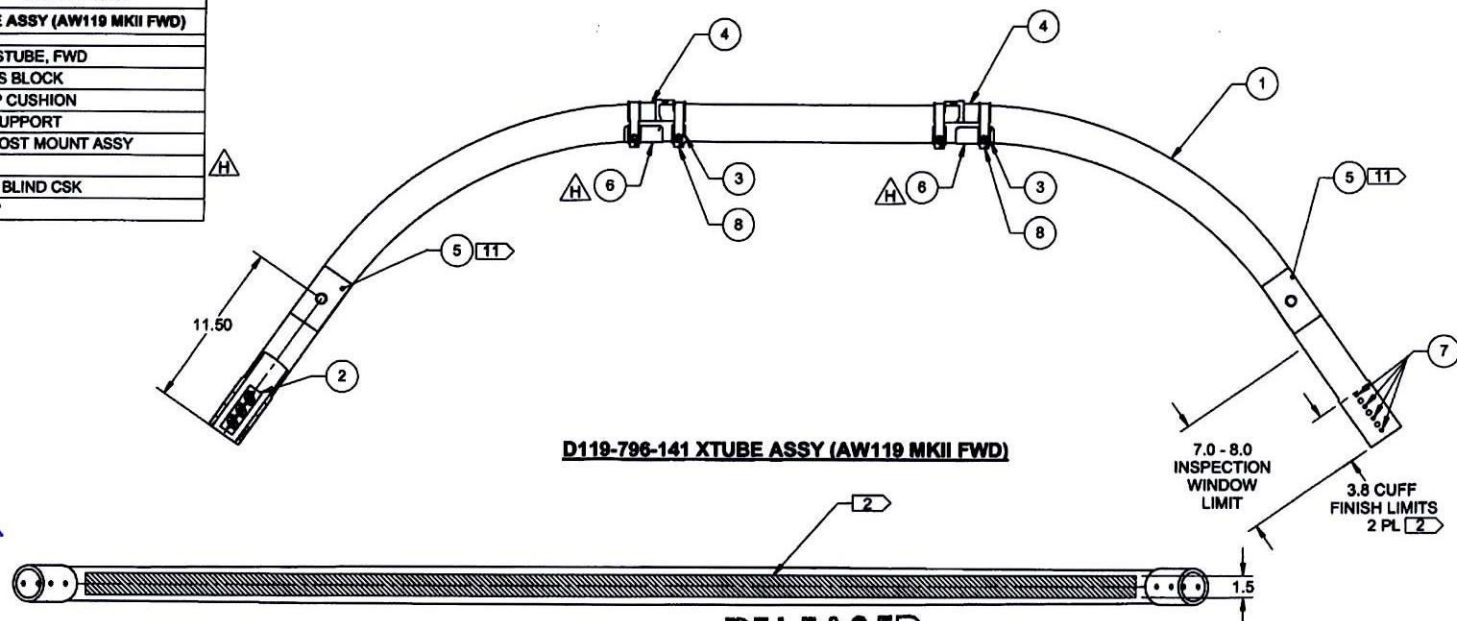
Date: 03/06/18

| Part Specifications |                                    |                                    |                    |      |                  |
|---------------------|------------------------------------|------------------------------------|--------------------|------|------------------|
| Spec No             | Description                        | Target/Tolerance                   | Limits             | Type | Special Comments |
| 1                   | Crosstube Assembly (AW119 MKI Fwd) | 6.000Inches $\pm$ 0.030            | 6.030<br>5.970     |      |                  |
| 2                   | Crosstube Assembly (AW119 MKI Fwd) | 2.516Inches $\pm$ 0.005            | 2.521<br>2.511     |      |                  |
| 3                   | Crosstube Assembly (AW119 MKI Fwd) | 2.333Inches $\pm$ 0.005<br>- 0.000 | 2.338<br>2.333     |      |                  |
| 4                   | Crosstube Assembly (AW119 MKI Fwd) | 2.333Inches $\pm$ 0.005<br>- 0.000 | 2.338<br>2.333     |      |                  |
| 5                   | Crosstube Assembly (AW119 MKI Fwd) | 2.408Inches $\pm$ 0.005<br>- 0.000 | 2.413<br>2.408     |      |                  |
| 6                   | Crosstube Assembly (AW119 MKI Fwd) | 2.502Inches $\pm$ 0.005<br>- 0.000 | 2.507<br>2.502     |      |                  |
| 7                   | Crosstube Assembly (AW119 MKI Fwd) | 2.596Inches $\pm$ 0.005<br>- 0.000 | 2.601<br>2.596     |      |                  |
| 8                   | Crosstube Assembly (AW119 MKI Fwd) | 2.596Inches $\pm$ 0.005<br>- 0.000 | 2.601<br>2.596     |      |                  |
| 9                   | Crosstube Assembly (AW119 MKI Fwd) | 6.000Inches $\pm$ 0.030            | 6.030<br>5.970     |      |                  |
| 10                  | Crosstube Assembly (AW119 MKI Fwd) | 2.516Inches $\pm$ 0.005            | 2.521<br>2.511     |      |                  |
| 11                  | Crosstube Assembly (AW119 MKI Fwd) | 2.333Inches $\pm$ 0.005<br>- 0.000 | 2.338<br>2.333     |      |                  |
| 12                  | Crosstube Assembly (AW119 MKI Fwd) | 2.333Inches $\pm$ 0.005<br>- 0.000 | 2.338<br>2.333     |      |                  |
| 13                  | Crosstube Assembly (AW119 MKI Fwd) | 2.408Inches $\pm$ 0.005<br>- 0.000 | 2.413<br>2.408     |      |                  |
| 14                  | Crosstube Assembly (AW119 MKI Fwd) | 2.502Inches $\pm$ 0.005<br>- 0.000 | 2.507<br>2.502     |      |                  |
| 15                  | Crosstube Assembly (AW119 MKI Fwd) | 2.596Inches $\pm$ 0.005<br>- 0.000 | 2.601<br>2.596     |      |                  |
| 16                  | Crosstube Assembly (AW119 MKI Fwd) | 2.596Inches $\pm$ 0.005<br>- 0.000 | 2.601<br>2.596     |      |                  |
| 17                  | Crosstube Assembly (AW119 MKI Fwd) | 102.260Inches $\pm$ 0.020          | 102.280<br>102.240 |      |                  |

Plex 2/8/18 8:00 AM Dart.Gagnon.Michelle



| ITEM | QTY | P/N             | DESCRIPTION                 |
|------|-----|-----------------|-----------------------------|
|      | X   | D119-796-141    | XTUBE ASSY (AW119 MKII FWD) |
| 1    | 1   | D119-796-141BND | CROSSTUBE, FWD              |
| 2    | 4   | D2873-043       | RADIUS BLOCK                |
| 3    | 4   | D5123-3         | CLAMP CUSHION               |
| 4    | 2   | D5124-1         | FWD SUPPORT                 |
| 5    | 2   | D5152-041       | FWD POST MOUNT ASSY         |
| 6    | 2   | D5305-1         | SHIM                        |
| 7    | 16  | CR3212-4-08     | RIVET, BLIND CSK            |
| 8    | 4   | MS21920-24      | CLAMP                       |



D119-796-141 XTUBE ASSY (AW119 MKII FWD)

RELEASED  
2015-11-04  
ECW 15-642

SHOP COPY

RETURN TO  
ENGINEERING

UNCONTROLLED COPY

SUBJECT TO AMENDMENT

WITHOUT NOTICE

WORK ORDER

NO. 171236

FEB 08 2018

NOTES:

1) MATERIAL: N/A

2) FINISH: APPLY MATTE CLEAR COAT PER QSI 005 4.2

MASK D5124-1 FWD SUPPORTS, D5305-1 SHIMS AS WELL AS UNDERSIDE OF CROSSTUBE AS SHOWN (B3-1, HATCHED AREA).

PAINT OUTSIDE PER DART QSI 005 4.2 AFTER APPLYING CLEAR COAT

DO NOT APPLY FINISH (PAINT OR CLEAR COAT) TO CUFFS IN LOCATION SHOWN, MASK PRIOR TO FINISHING

3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED

4) UNITS: INCHES UNLESS OTHERWISE NOTED

5) BREAK SHARP EDGES: N/A

6) IDENTIFICATION: IDENTIFY USING PART NUMBER "D119-796-141" AND BATCH NUMBER ON INSIDE OF CUFF PER QSI 044 6.4

7) WEIGHT: 18.54 lbs

8) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE.

THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS.

DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

9) PRIOR TO FINISHING, ABRASE MATING SURFACES OF D5124-1 FWD SUPPORTS AND CROSSTUBE WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. APPLY A 0.1 MIN THK LAYER OF PROSEAL 890 ON

THE INSIDE CONCAVE SURFACE OF THE D5124-1 FWD SUPPORTS AND INSTALL AT AN 8.4" OFFSET FROM THE CROSSTUBE BENDING PLANE. INSTALL THE MS21920-24 CLAMPS AND D5123-3 CLAMP CUSHIONS WHILE WET.

10) TORQUE MS21920 CLAMPS 80 - 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY. THE NUT IS FACING AFT AND HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

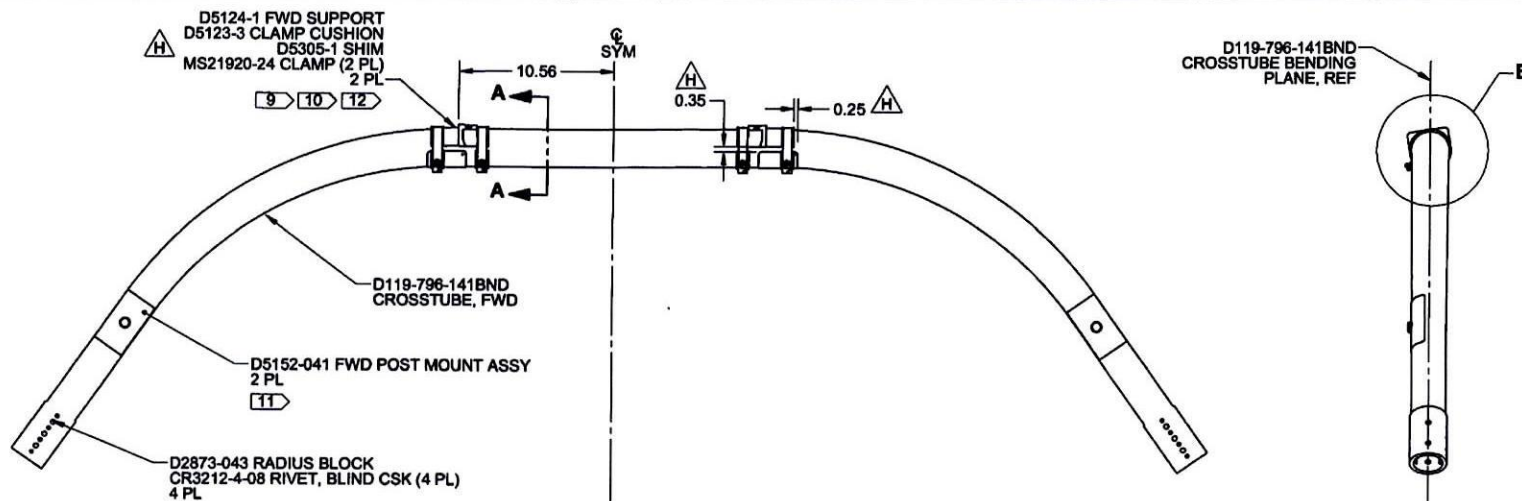
11) PRIOR TO FINISHING, ABRASE MATING SURFACES OF CROSSTUBE AND D5152-041 WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. INSTALL D5152-041 WITH LAYER OF PROSEAL 890 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. LOCATE D5152-041 USING TOOL DT10089.

12) PRIOR TO FINISHING, ABRASE MATING SURFACES OF CROSSTUBE AND D5305-1 SHIM WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. INSTALL D5305-1 SHIM WITH LAYER OF PROSEAL 890 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. USE ADDITIONAL TEMPORARY MS21920-24 CLAMP TO APPLY CLAMPING PRESSURE FOR 72 HOURS.

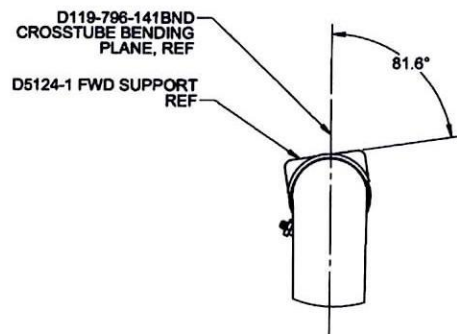
|      |                                                                                                                                                                              |    |          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------|
| H    | ADD D5305-1 SHIM. D5024-103 WAS D6005-103, D5124-1 NOW INSTALLED ON PRIMER                                                                                                   | AP | 15.10.13 |
| G    | FINISHING ORDER ADJUSTED. CR3212-4-08 WAS -07. CUFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                     | AP | 15.04.24 |
| F    | REMOVED PRIME/ PAINT ON CUFFS. 2.516 WAS 2.500 (C8-5)                                                                                                                        | AP | 15.02.03 |
| E    | D5152-041 FWD STEP POST ASSY WAS D5150-1 STEP POST. SCOTCH BRITE 7447 RED WAS 180 GRIT SANDPAPER, ANGLE (B7-2) DIMENSIONED FROM NEW DATUM                                    | DB | 15.01.15 |
| D    | ADD D5150-1 STEP POST (2X). MOVED INSPECTION WINDOW DETAIL TO SHEET 1, MODIFIED NOTES ON SHT 1 & 3                                                                           | DB | 14.11.25 |
| C    | CR3212-4-07 RIVETS WERE CR3212-4-08, 7.5 DEG CUFF ANGLE OFFSET REMOVED (SHT 3). CUFF DIAMETER ON D119-796-141TRN REDUCED TO 2.500. ADDED INSPECTION WINDOW (B7-3). ADDED SHT | AP | 14.10.23 |
| B    | ADDED D2873-043 RADIUS BLOCK. CR3212-4-09 RIVETS. ADDED SKIDTUBE REFERENCE FOR LOCATING CUFF HOLES. RE-ORGANIZED NOTES AND REMOVED REDUNDANT INFORMATION                     | AP | 14.09.02 |
| A    | NEW ISSUE                                                                                                                                                                    | AP | 14.08.09 |
| REV. | DESCRIPTION                                                                                                                                                                  | BY | DATE     |

APPROVED

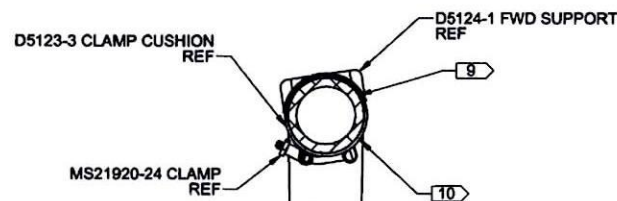
|            |          |                                                                                                                                                                                                                                                                         |              |
|------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                         |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                             | REV. H       |
| MFG. APPR. | JLM      | D119-796-141                                                                                                                                                                                                                                                            | SHEET 1 OF 6 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                   | SCALE        |
| DE APPR.   | DS       | XTUBE ASSY (AW119 MKII FWD)                                                                                                                                                                                                                                             | NTS          |
| DATE       | 15.10.13 | COPYRIGHT © 2014 BY DART AEROSPACE LTD<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD |              |



**D119-796-141 XTUBE ASSY (AW119 MKII FWD)**



**DETAIL B**  
SCALE 2X



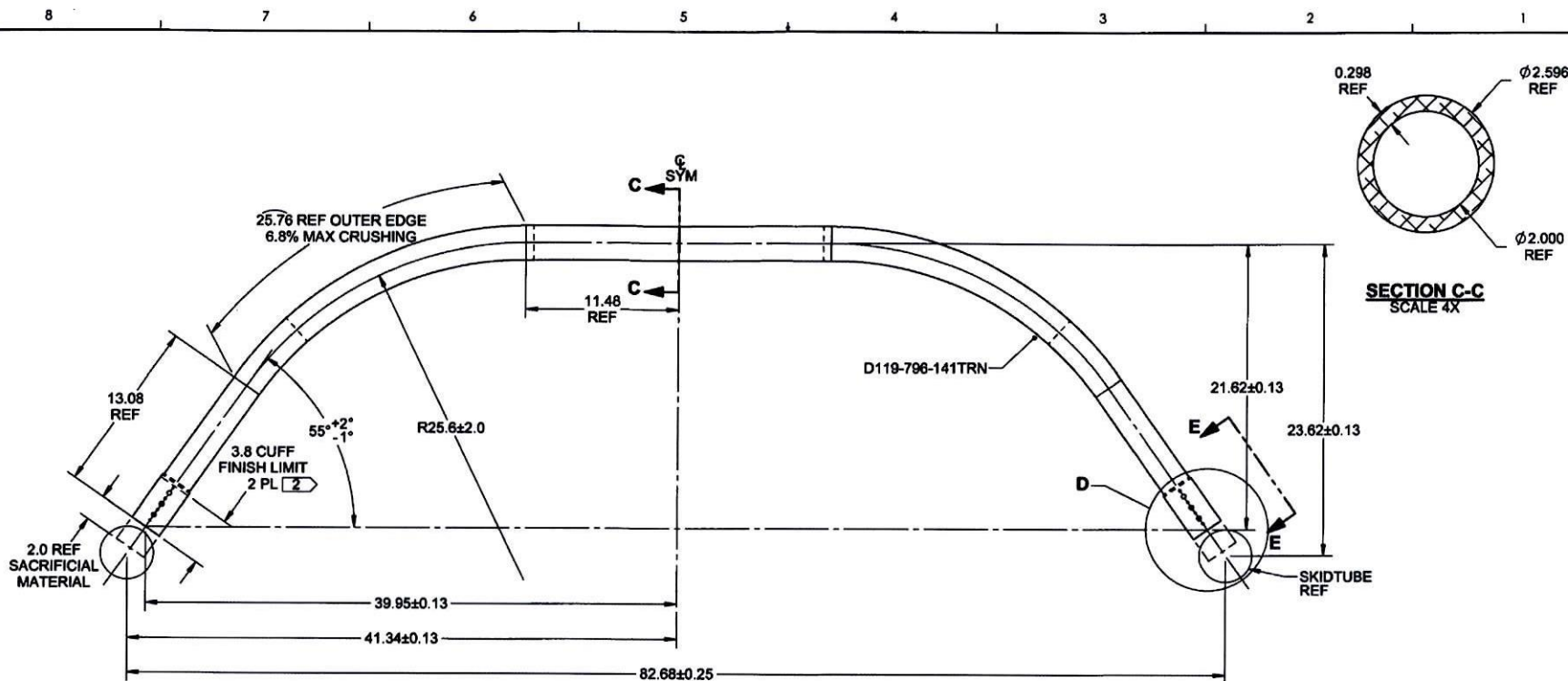
**SECTION A-A**  
SCALE 2X

**RELEASED**  
2015-11-04

APPROVED

|            |          |                                                                                                                                                                                                                                                                          |              |
|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                 |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                          |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                              | REV. H       |
| MFG. APPR. | JLM      | <b>D119-796-141</b>                                                                                                                                                                                                                                                      | SHEET 2 OF 8 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                    | SCALE        |
| DE APPR.   | DS       | <b>XTUBE ASSY (AW119 MKII FWD)</b>                                                                                                                                                                                                                                       | NTS          |
| DATE       | 15.10.13 | COPYRIGHT © 2014 BY DART AEROSPACE LTD<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. |              |





**D119-796-141BND CROSSTUBE, FWD**  
BENDING AND DRILLING DETAIL

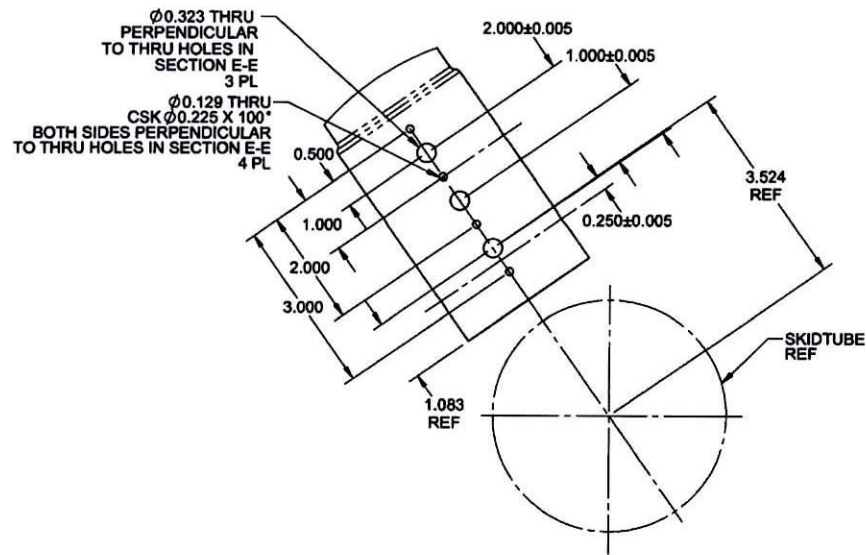
**NOTES:**

- 1) MATERIAL: MADE FROM D119-796-141TRN
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
DO NOT APPLY PRIMER TO CUFFS IN LOCATION SHOWN, MASK PRIOR TO FINISHING
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: 16.70 lbs
- 8) PART IS SYMMETRICAL ABOUT CENTERLINE
- 9) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6.8% BASED ON OD.
- 10) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS. DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

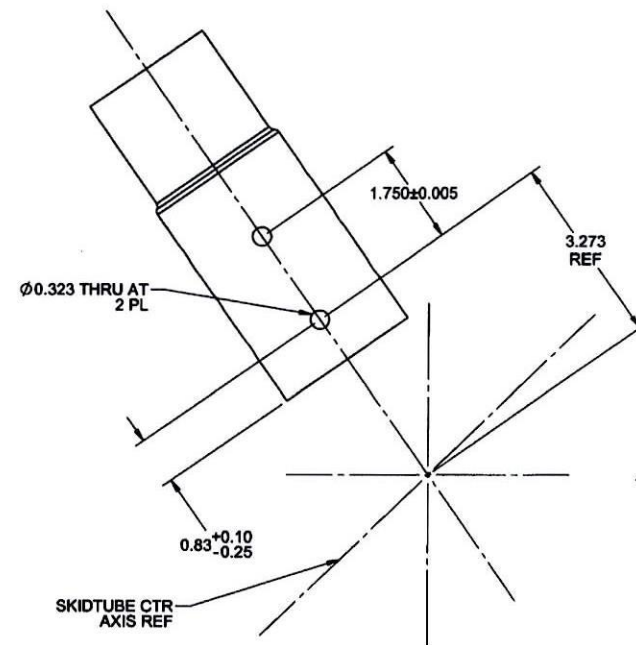
**RELEASED**  
2015-11-04

APPROVED

|                                                                                                                                                                                                                                |          |                                        |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------|
| DESIGN                                                                                                                                                                                                                         | AP       | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN                                                                                                                                                                                                                          | AP       | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED                                                                                                                                                                                                                        | AJS      | DRAWING NO.                            | REV. H       |
| MFG. APPR.                                                                                                                                                                                                                     | JLM      | D119-796-141                           | SHEET 3 OF 6 |
| APPROVED                                                                                                                                                                                                                       | WM       | TITLE                                  | SCALE        |
| DE APPR.                                                                                                                                                                                                                       | DS       | XTUBE ASSY (AW119 MKII FWD)            | NTS          |
| DATE                                                                                                                                                                                                                           | 15.10.13 | COPYRIGHT © 2014 BY DART AEROSPACE LTD |              |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. |          |                                        |              |



**VIEW D**  
SCALE 4X



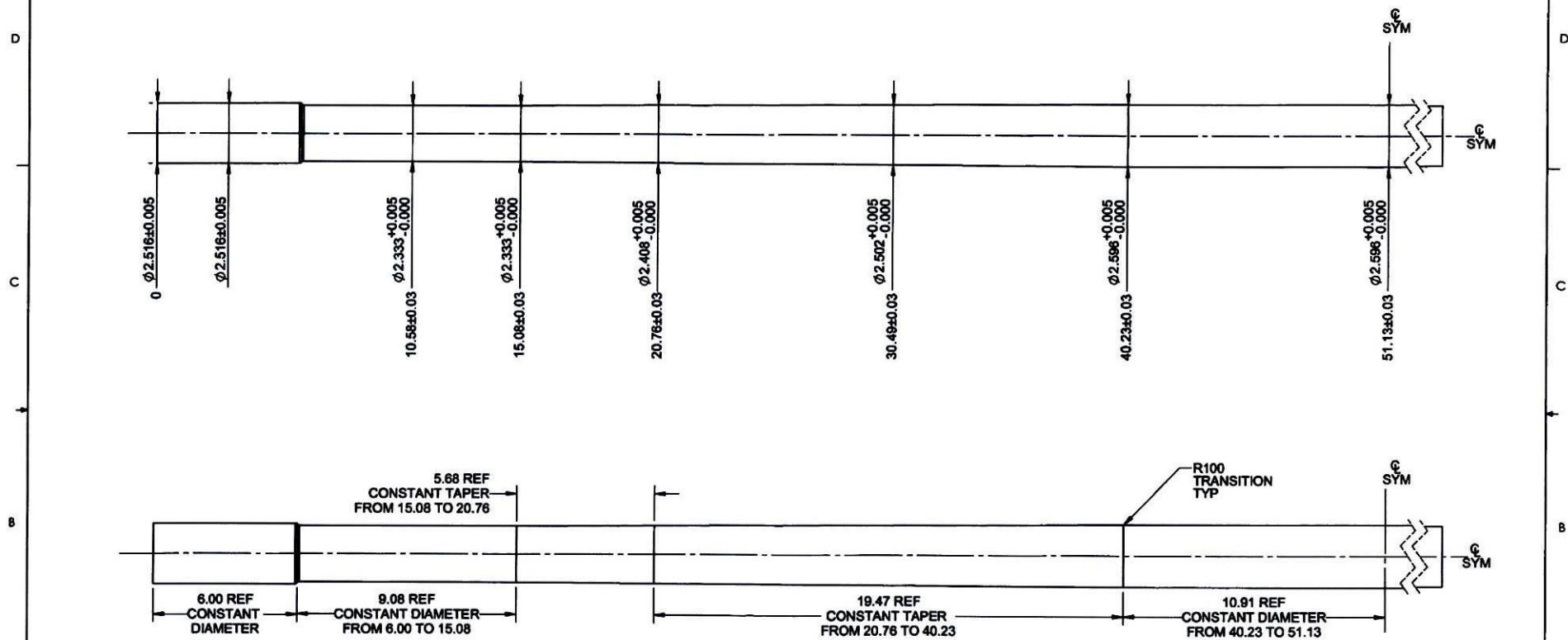
**VIEW E-E**  
SCALE 2X

**RELEASED**  
2015-11-04

APPROVED

|                                                                                                                                                                                                                                |          |                                        |              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------|
| DESIGN                                                                                                                                                                                                                         | AP       | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN                                                                                                                                                                                                                          | AP       | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED                                                                                                                                                                                                                        | AJS      | DRAWING NO.                            | REV. H       |
| MFG. APPR.                                                                                                                                                                                                                     | JLM      | D119-796-141                           | SHEET 4 OF 6 |
| APPROVED                                                                                                                                                                                                                       | WM       | TITLE                                  | SCALE        |
| DE APPR.                                                                                                                                                                                                                       | DS       | XTUBE ASSY (AW119 MKII FWD)            | NTS          |
| DATE                                                                                                                                                                                                                           | 15.10.13 | COPYRIGHT © 2014 BY DART AEROSPACE LTD |              |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. |          |                                        |              |

8 7 6 5 4 3 2 1



**D119-796-141TRN CROSSTUBE, FWD**

**NOTES:**

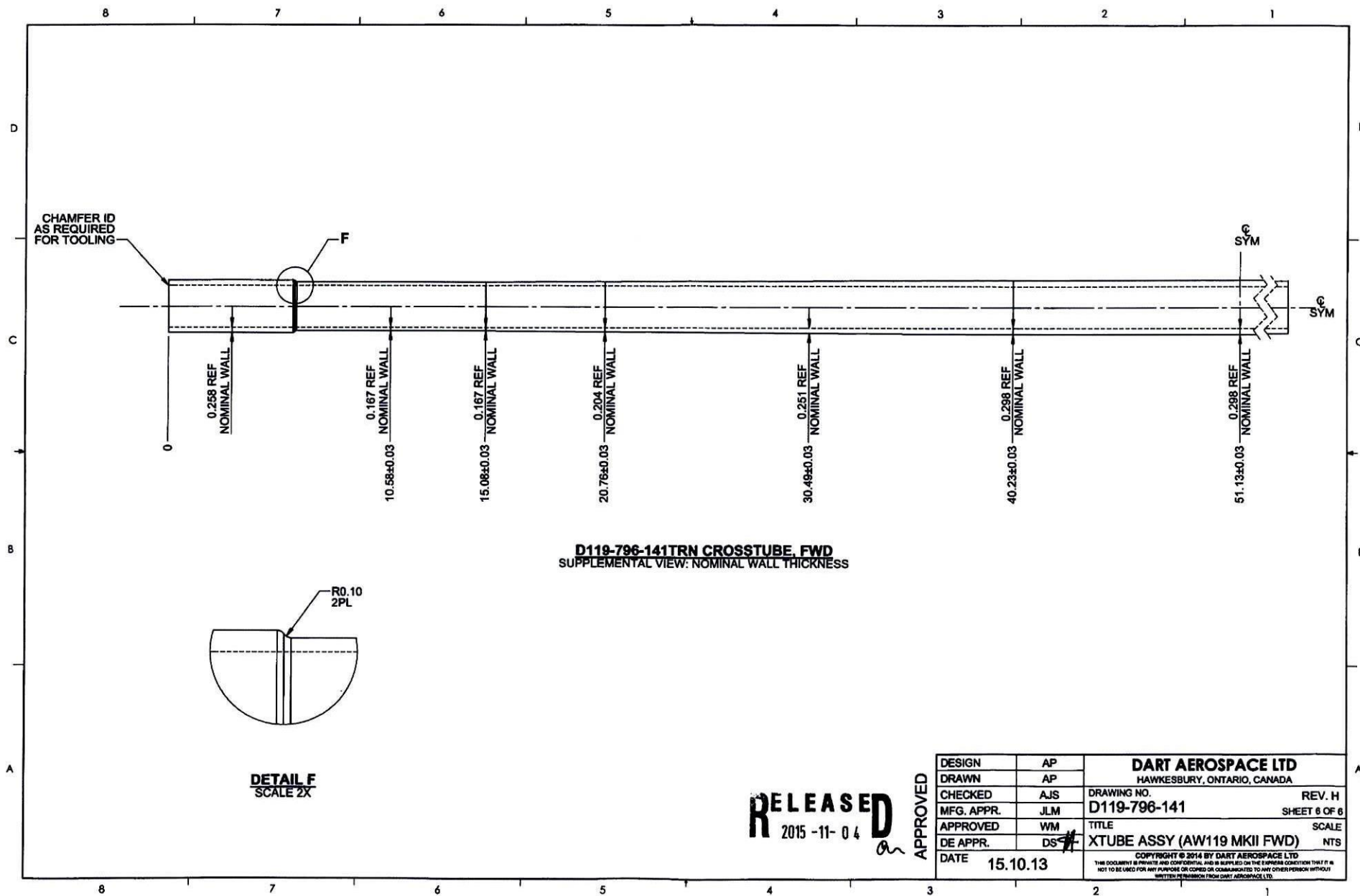
- 1) MATERIAL: MANUFACTURE FROM D6024-103 (PREFERRED) OR D6005-103  
FINISHED LENGTH = 102.26  $\pm 0.020$  (BEFORE BENDING/TRIMMING)
- 2) FINISH: NONE
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: 16.70 lbs
- 8) PART IS SYMMETRICAL ABOUT CENTERLINE

**RELEASED**  
2015-11-04

**APPROVED**

|            |          |                                                                                                                                                                                                                                                                                   |              |
|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                          |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                                   |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                                       | REV. H       |
| MFG. APPR. | JLM      | D119-796-141                                                                                                                                                                                                                                                                      | SHEET 5 OF 6 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                             | SCALE        |
| DE APPR.   | DS       | XTUBE ASSY (AW119 MKII FWD)                                                                                                                                                                                                                                                       | NTS          |
| DATE       | 15.10.13 | COPYRIGHT © 2014 BY DART AEROSPACE LTD<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS<br>NOT TO BE USED FOR ANY PURPOSE OR COMMERCE OR COMMUNICATION TO ANY OTHER PERSON WITHOUT<br>WRITTEN PERMISSION FROM DART AEROSPACE LTD. |              |



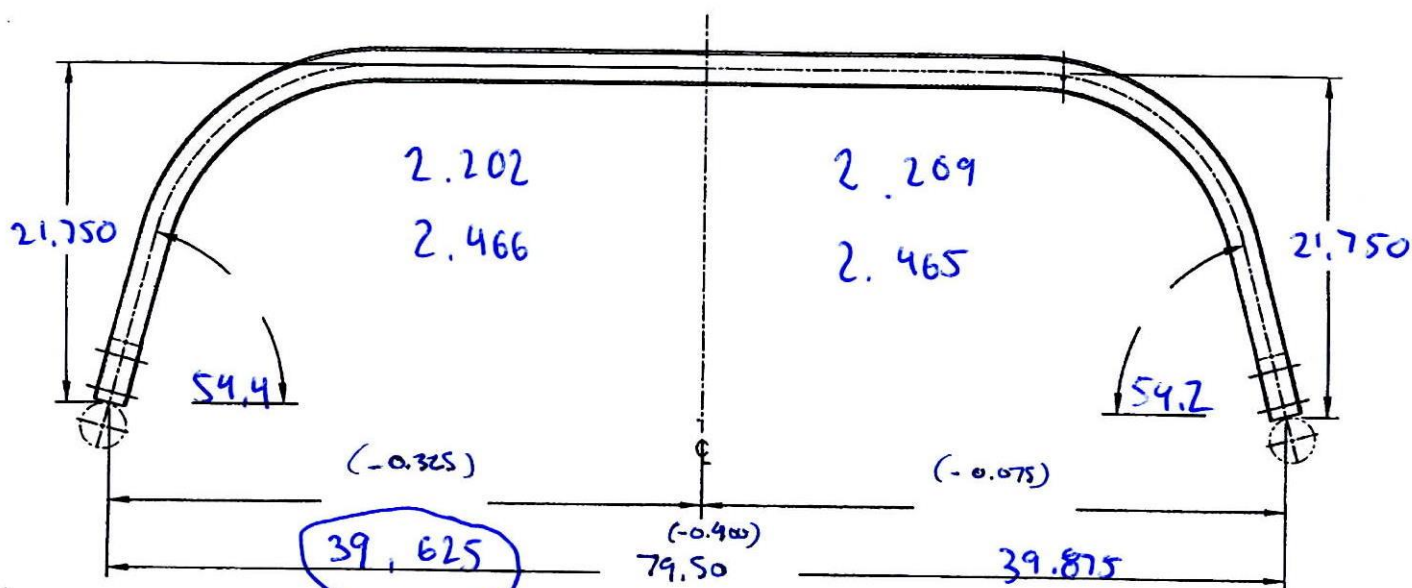


RELEASED  
2015-11-04

APPROVED

|                                                   |  |                     |                     |
|---------------------------------------------------|--|---------------------|---------------------|
| <b>DART AEROSPACE LTD</b>                         |  | <b>Work Order:</b>  |                     |
| <b>Description:</b> Crosstube Fwd, with Step      |  | <b>Part Number:</b> | <b>D119-796-141</b> |
| <b>Inspection Dwg:</b> D119-796-141 <b>Rev:</b> H |  | <b>Page 1 of 1</b>  |                     |

| Required Dimension | Min    | Max    |
|--------------------|--------|--------|
| Height             | 21.490 | 21.750 |
| 1/2 Span           | 39.820 | 40.080 |
| Angle              | 54°    | 57°    |
| Total Span         | 79.640 | 80.160 |
| Bending Passes     | 8      | --     |
| Crushing           | --     | 6.8%   |



|                       | Side A | Side B |
|-----------------------|--------|--------|
| <b>Bending Passes</b> | 9      | 9      |
| <b>Crushing</b>       | 5.7%   | 5.5%   |
| <b>Comments</b>       |        |        |
|                       |        |        |
|                       |        |        |
|                       |        |        |
|                       |        |        |

|                        |  |
|------------------------|--|
| <b>QC15 Inspection</b> |  |
| <b>Date</b>            |  |

| Rev | Date     | Change          | Revised by | Approved |
|-----|----------|-----------------|------------|----------|
| A   | 15.04.14 | New Issue       | KJ         |          |
| B   | 15.11.12 | Dwg Rev updated | KJ         |          |
| C   | 16.01.15 | Dwg Rev updated | KJ         | up       |



DQA: \_\_\_\_\_ Date: \_\_\_\_\_

**WORK ORDER NON-CONFORMANCE / UPDATE**

QA Closed: \_\_\_\_\_ Date: \_\_\_\_\_

Work Order update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------|------------------------------------------------|---------------------------------------|--------------------------------------|----------------------------------------------|------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------------------------------|------------------------------------|----------------------------------------------|----------------------------------------------|-------------------------------------|----------------------------------------------|-------------------------------------------|------------------------------------------------|----------------------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Work Order: _____<br><br>Part No. _____<br><br>NCR No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                         | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input checked="" type="checkbox"/><br>Use-as-is <input type="checkbox"/><br>Suspected Unapproved <input type="checkbox"/> |                                                                                                                                                                         | <b>AGAINST DEPARTMENT/PROCESS</b><br><br><table style="width:100%; border: none;"> <tr> <td style="border: none;">Skid-tube <input type="checkbox"/></td> <td style="border: none;">Cross tube <input checked="" type="checkbox"/></td> <td style="border: none;">Water Jet <input type="checkbox"/></td> <td style="border: none;">Engineering <input type="checkbox"/></td> </tr> <tr> <td style="border: none;">Machining <input type="checkbox"/></td> <td style="border: none;">Small Fab <input type="checkbox"/></td> <td style="border: none;">Prod. Eng. Coord. <input type="checkbox"/></td> <td style="border: none;">Quality <input type="checkbox"/></td> </tr> <tr> <td style="border: none;">Thermoforming <input type="checkbox"/></td> <td style="border: none;">Finishing <input type="checkbox"/></td> <td style="border: none;">Rec/Store/Packaging <input type="checkbox"/></td> <td style="border: none;">Other <input type="checkbox"/></td> </tr> <tr> <td style="border: none;">Large Fab <input type="checkbox"/></td> <td style="border: none;">Composite <input type="checkbox"/></td> <td style="border: none;">Supplier <input type="checkbox"/></td> <td></td> </tr> </table> |                                             |                                 |                                   |                                                                                                                                                            |                                       | Skid-tube <input type="checkbox"/>     | Cross tube <input checked="" type="checkbox"/> | Water Jet <input type="checkbox"/>    | Engineering <input type="checkbox"/> | Machining <input type="checkbox"/>           | Small Fab <input type="checkbox"/>       | Prod. Eng. Coord. <input type="checkbox"/>  | Quality <input type="checkbox"/>          | Thermoforming <input type="checkbox"/>    | Finishing <input type="checkbox"/> | Rec/Store/Packaging <input type="checkbox"/> | Other <input type="checkbox"/>               | Large Fab <input type="checkbox"/>  | Composite <input type="checkbox"/>           | Supplier <input type="checkbox"/>         |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Skid-tube <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Cross tube <input checked="" type="checkbox"/>                                                                                                                                                          | Water Jet <input type="checkbox"/>                                                                                                                                                            | Engineering <input type="checkbox"/>                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Machining <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Small Fab <input type="checkbox"/>                                                                                                                                                                      | Prod. Eng. Coord. <input type="checkbox"/>                                                                                                                                                    | Quality <input type="checkbox"/>                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Thermoforming <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Finishing <input type="checkbox"/>                                                                                                                                                                      | Rec/Store/Packaging <input type="checkbox"/>                                                                                                                                                  | Other <input type="checkbox"/>                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Large Fab <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Composite <input type="checkbox"/>                                                                                                                                                                      | Supplier <input type="checkbox"/>                                                                                                                                                             |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Date: 18/3/7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                         | Step #: 130                                                                                                                                                                                   |                                                                                                                                                                         | QTY Effective: ①                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                             |                                 | MRB (QS1042) Approval             |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                             |                                 |                                   | 18/3/7                                                                                                                                                     |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Tube is bent narrow. One dim is -0.325 below nominal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         | Scrap. Bend is excessive and uneven.<br><br><div style="text-align: center;"> <b>DAS</b><br/> <b>12</b><br/> <b>9-89</b> 18/3/7         </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                             |                                 |                                   | Completed By<br><div style="font-size: 2em; font-family: cursive;">GP</div>                                                                                |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   | Lead hand / Supervisor<br>Approval Verification<br><br><div style="text-align: center;"> <b>DAS</b><br/> <b>9</b><br/> <b>9-89</b> 18-06-04         </div> |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   | QC / QA Coordinator<br>Approval<br><br><div style="text-align: center;"> <b>DAS</b><br/> <b>9</b><br/> <b>9-89</b> 18-06-04         </div>                 |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| <b>Root Cause</b><br><table style="width:100%; border: none;"> <tr><td style="border: none;">Environment <input type="checkbox"/></td><td style="border: none;">No Re-verification <input type="checkbox"/></td></tr> <tr><td style="border: none;">Design <input type="checkbox"/></td><td style="border: none;">Operator <input type="checkbox"/></td></tr> <tr><td style="border: none;">Doc/Data <input type="checkbox"/></td><td style="border: none;">Offset/Setup <input type="checkbox"/></td></tr> <tr><td style="border: none;">Equip/Tooling <input type="checkbox"/></td><td style="border: none;">Supplier <input type="checkbox"/></td></tr> <tr><td style="border: none;">Handling/Pre <input type="checkbox"/></td><td style="border: none;">Training <input type="checkbox"/></td></tr> <tr><td style="border: none;">Material <input checked="" type="checkbox"/></td><td style="border: none;">Use for Testing <input type="checkbox"/></td></tr> <tr><td style="border: none;">Internal Transport <input type="checkbox"/></td><td style="border: none;">Poor Information <input type="checkbox"/></td></tr> <tr><td style="border: none;">Tribal Knowledge <input type="checkbox"/></td><td style="border: none;">Rushing <input type="checkbox"/></td></tr> <tr><td style="border: none;">LOA <input type="checkbox"/></td><td style="border: none;">Product Improvement <input type="checkbox"/></td></tr> <tr><td style="border: none;">Substation <input type="checkbox"/></td><td style="border: none;">Process Improvement <input type="checkbox"/></td></tr> <tr><td style="border: none;">Past Expiry Date <input type="checkbox"/></td><td style="border: none;">Manufacturing Process <input type="checkbox"/></td></tr> <tr><td style="border: none;">Misidentified <input type="checkbox"/></td><td style="border: none;">Past Due <input type="checkbox"/></td></tr> </table> |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         | Environment <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | No Re-verification <input type="checkbox"/> | Design <input type="checkbox"/> | Operator <input type="checkbox"/> | Doc/Data <input type="checkbox"/>                                                                                                                          | Offset/Setup <input type="checkbox"/> | Equip/Tooling <input type="checkbox"/> | Supplier <input type="checkbox"/>              | Handling/Pre <input type="checkbox"/> | Training <input type="checkbox"/>    | Material <input checked="" type="checkbox"/> | Use for Testing <input type="checkbox"/> | Internal Transport <input type="checkbox"/> | Poor Information <input type="checkbox"/> | Tribal Knowledge <input type="checkbox"/> | Rushing <input type="checkbox"/>   | LOA <input type="checkbox"/>                 | Product Improvement <input type="checkbox"/> | Substation <input type="checkbox"/> | Process Improvement <input type="checkbox"/> | Past Expiry Date <input type="checkbox"/> | Manufacturing Process <input type="checkbox"/> | Misidentified <input type="checkbox"/> | Past Due <input type="checkbox"/> | <b>FAULT CATEGORY</b><br><table style="width:100%; border: none;"> <tr> <td style="border: none; vertical-align: top;">           Pressure/Forced<br/> <input checked="" type="checkbox"/> Bending<br/>           Centre Not Concentric<br/>           Cracks<br/>           Crimp/Kink/Ripple/Wave<br/>           Cuffs<br/>           Crushing<br/>           Heat Treat<br/>           Wave/Twist in Tube<br/>           Marks/Chatter         </td> <td style="border: none; vertical-align: top;">           Temperature/Cure<br/>           Set-up<br/>           BOM/Route<br/>           Broken/Damage/Defect<br/>           Inspection Incomplete/Unqualified<br/>           Contamination<br/>           Countersink<br/>           Cut Too Short<br/>           Instructions Incomplete/Unclear<br/>           Drill Holes         </td> <td style="border: none; vertical-align: top;">           Power Loss/Surge<br/>           Folio/Program<br/>           Grain<br/>           Weld<br/>           Wrong Stock Pulled<br/>           Out of Sequence<br/>           Off-set<br/>           Mislabeled<br/>           Fit/Function<br/>           Misaligned/off center         </td> <td style="border: none; vertical-align: top;">           Positioned Wrong<br/>           Outside Dimensions<br/>           Over/Under tolerance<br/>           Part Incorrect<br/>           Part Lost/Missing<br/>           Part Moved<br/>           Drawing<br/>           Finish<br/>           Misread<br/>           Turning Sequence         </td> </tr> </table> |  |  |  |  | Pressure/Forced<br><input checked="" type="checkbox"/> Bending<br>Centre Not Concentric<br>Cracks<br>Crimp/Kink/Ripple/Wave<br>Cuffs<br>Crushing<br>Heat Treat<br>Wave/Twist in Tube<br>Marks/Chatter | Temperature/Cure<br>Set-up<br>BOM/Route<br>Broken/Damage/Defect<br>Inspection Incomplete/Unqualified<br>Contamination<br>Countersink<br>Cut Too Short<br>Instructions Incomplete/Unclear<br>Drill Holes | Power Loss/Surge<br>Folio/Program<br>Grain<br>Weld<br>Wrong Stock Pulled<br>Out of Sequence<br>Off-set<br>Mislabeled<br>Fit/Function<br>Misaligned/off center | Positioned Wrong<br>Outside Dimensions<br>Over/Under tolerance<br>Part Incorrect<br>Part Lost/Missing<br>Part Moved<br>Drawing<br>Finish<br>Misread<br>Turning Sequence |
| Environment <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | No Re-verification <input type="checkbox"/>                                                                                                                                                             |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Design <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Operator <input type="checkbox"/>                                                                                                                                                                       |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Doc/Data <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Offset/Setup <input type="checkbox"/>                                                                                                                                                                   |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Equip/Tooling <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Supplier <input type="checkbox"/>                                                                                                                                                                       |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Handling/Pre <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Training <input type="checkbox"/>                                                                                                                                                                       |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Material <input checked="" type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Use for Testing <input type="checkbox"/>                                                                                                                                                                |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Internal Transport <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Poor Information <input type="checkbox"/>                                                                                                                                                               |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Tribal Knowledge <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Rushing <input type="checkbox"/>                                                                                                                                                                        |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| LOA <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Product Improvement <input type="checkbox"/>                                                                                                                                                            |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Substation <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Process Improvement <input type="checkbox"/>                                                                                                                                                            |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Past Expiry Date <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Manufacturing Process <input type="checkbox"/>                                                                                                                                                          |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Misidentified <input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Past Due <input type="checkbox"/>                                                                                                                                                                       |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| Pressure/Forced<br><input checked="" type="checkbox"/> Bending<br>Centre Not Concentric<br>Cracks<br>Crimp/Kink/Ripple/Wave<br>Cuffs<br>Crushing<br>Heat Treat<br>Wave/Twist in Tube<br>Marks/Chatter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Temperature/Cure<br>Set-up<br>BOM/Route<br>Broken/Damage/Defect<br>Inspection Incomplete/Unqualified<br>Contamination<br>Countersink<br>Cut Too Short<br>Instructions Incomplete/Unclear<br>Drill Holes | Power Loss/Surge<br>Folio/Program<br>Grain<br>Weld<br>Wrong Stock Pulled<br>Out of Sequence<br>Off-set<br>Mislabeled<br>Fit/Function<br>Misaligned/off center                                 | Positioned Wrong<br>Outside Dimensions<br>Over/Under tolerance<br>Part Incorrect<br>Part Lost/Missing<br>Part Moved<br>Drawing<br>Finish<br>Misread<br>Turning Sequence |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |
| OTHER : _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                         |                                                                                                                                                                                               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                             |                                 |                                   |                                                                                                                                                            |                                       |                                        |                                                |                                       |                                      |                                              |                                          |                                             |                                           |                                           |                                    |                                              |                                              |                                     |                                              |                                           |                                                |                                        |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |  |  |  |                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                                                                                                                               |                                                                                                                                                                         |